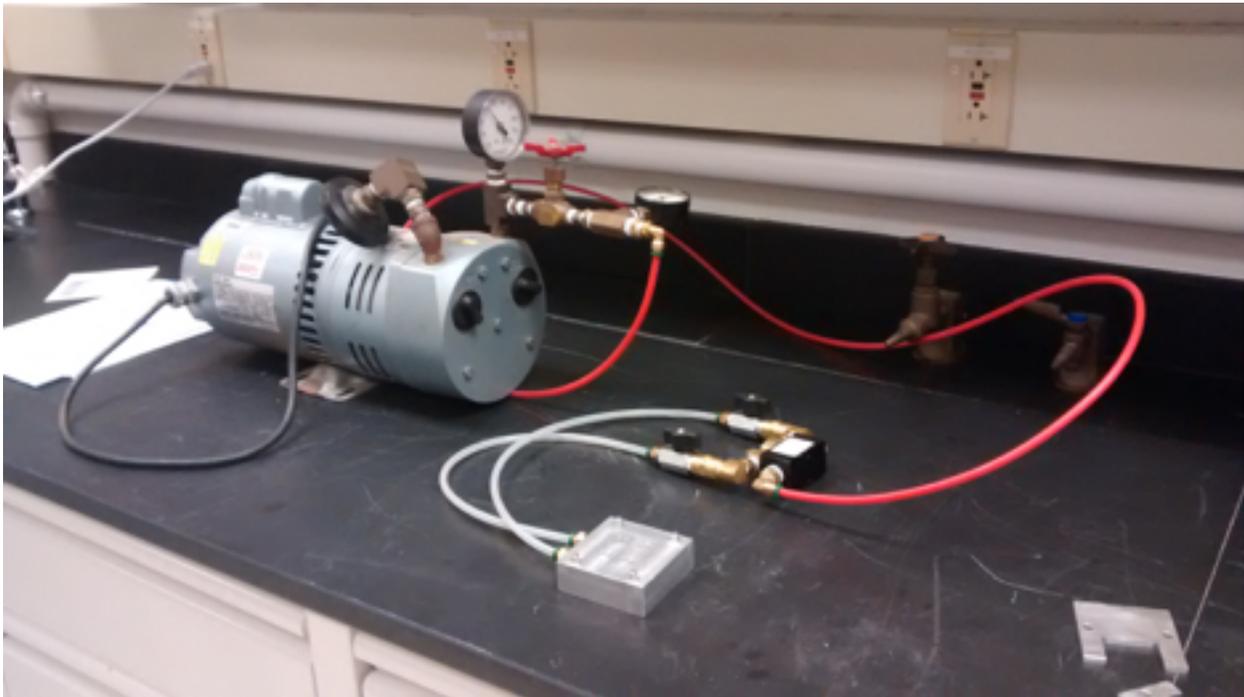


Dummy Module Assembly

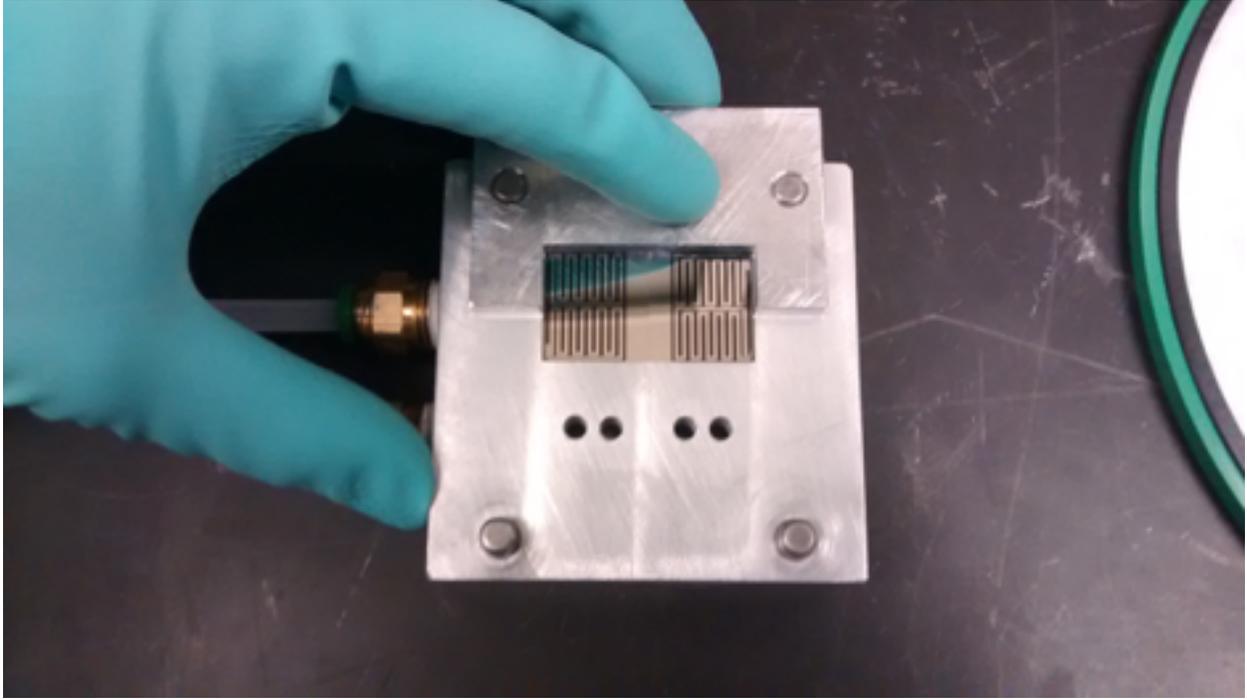
In this document we describe how to assemble dummy modules using two assembly jigs (one for attaching silicon detectors to front-end chips, and one for attaching flex cables) and double-sided epoxy tape.

Begin with four front-end chips, a silicon detector (either a full-sized quad-detector or a half-sized 1x2 detector), the vacuum pump, and the pictured assembly jig. The jig should come with two detachable plates. ****NOTE: All images in this document show assembly of a quad module.**

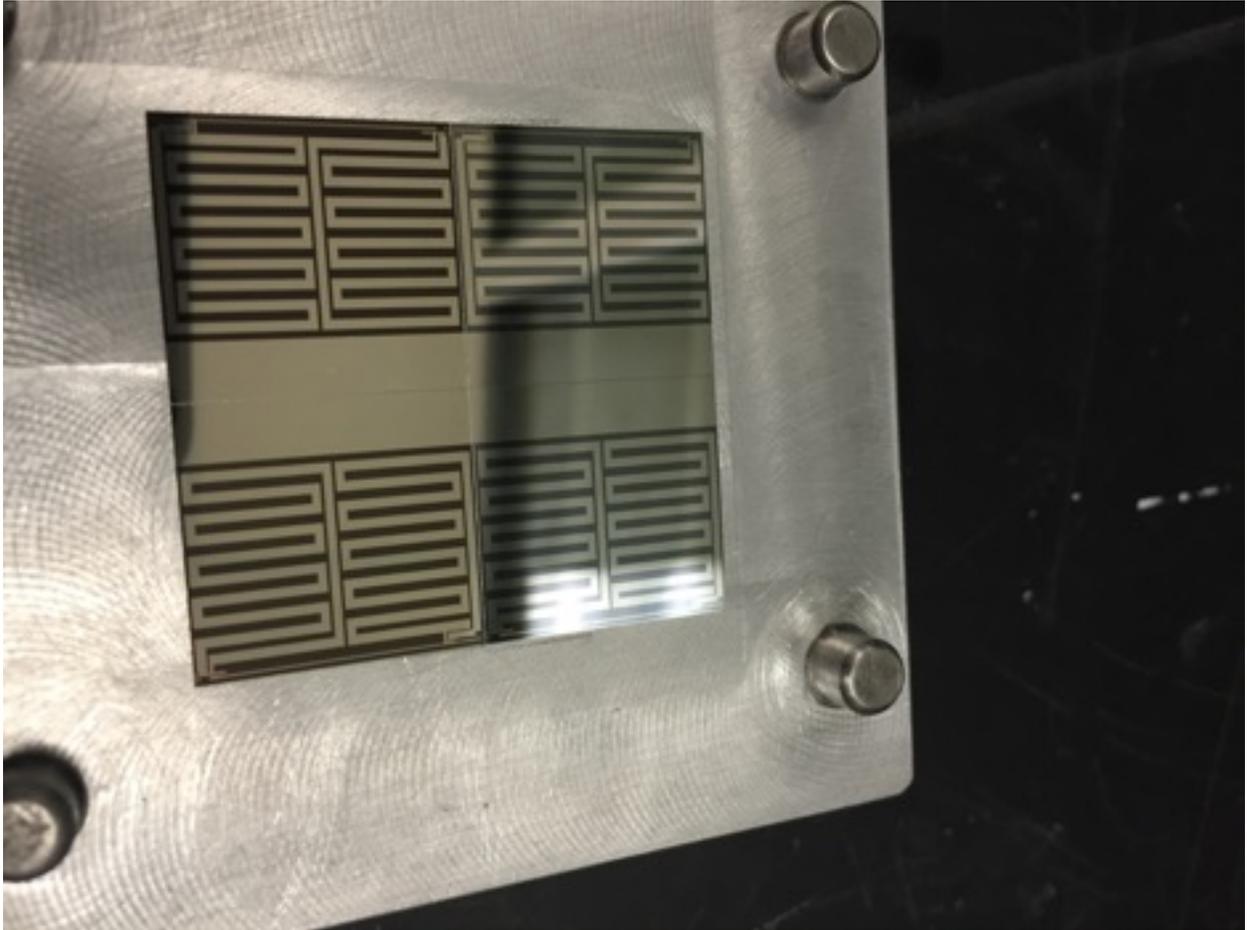
Attach the jig to a vacuum with two control valves. These control the left and right channels separately. Before any front-end chips are placed on the jig, make sure that the vacuum is off.



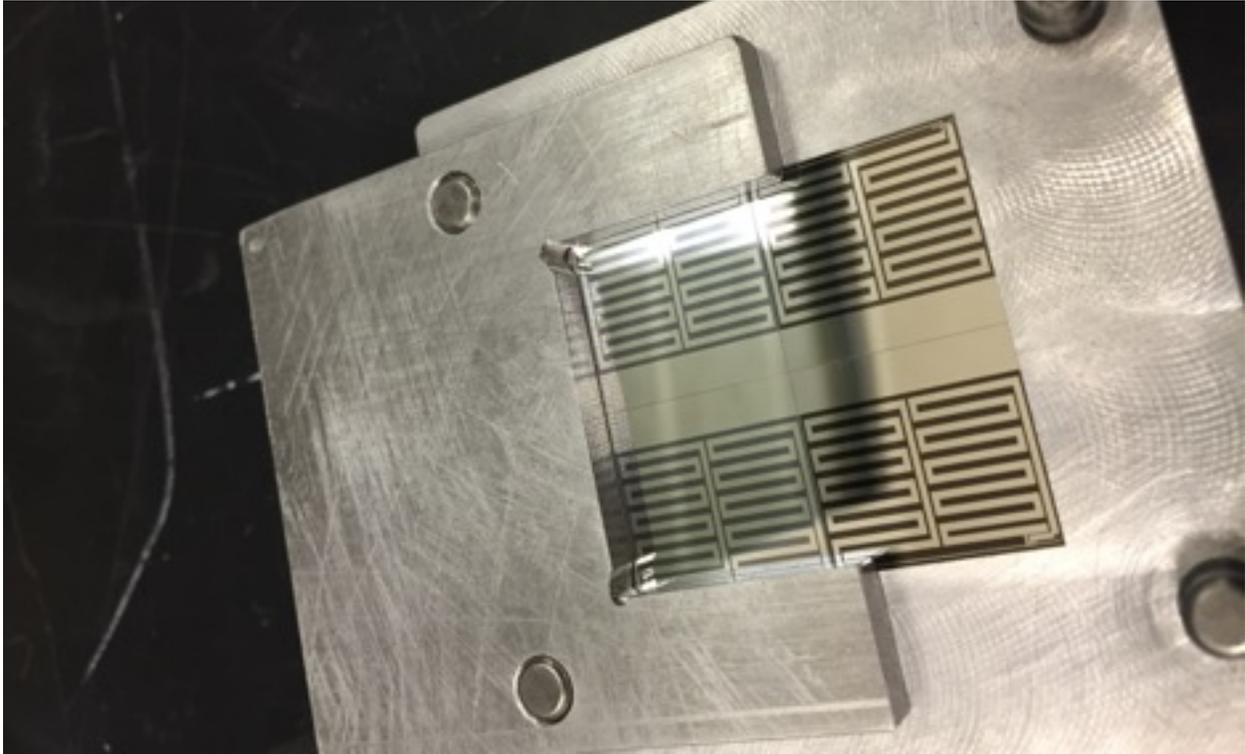
One of the detachable plates should have a slightly wider opening than the other. This one is used for positioning the front-end chips. Place this plate on the jig. Since it has some lateral freedom of movement, push the plate towards the center so as to get a consistent placement. Place two front-end chips on the jig, and push them towards the corners of the alignment plate. Note the placement of the bump-bonding pads on the front-end chips. Open one vacuum channel to keep the chips in place.



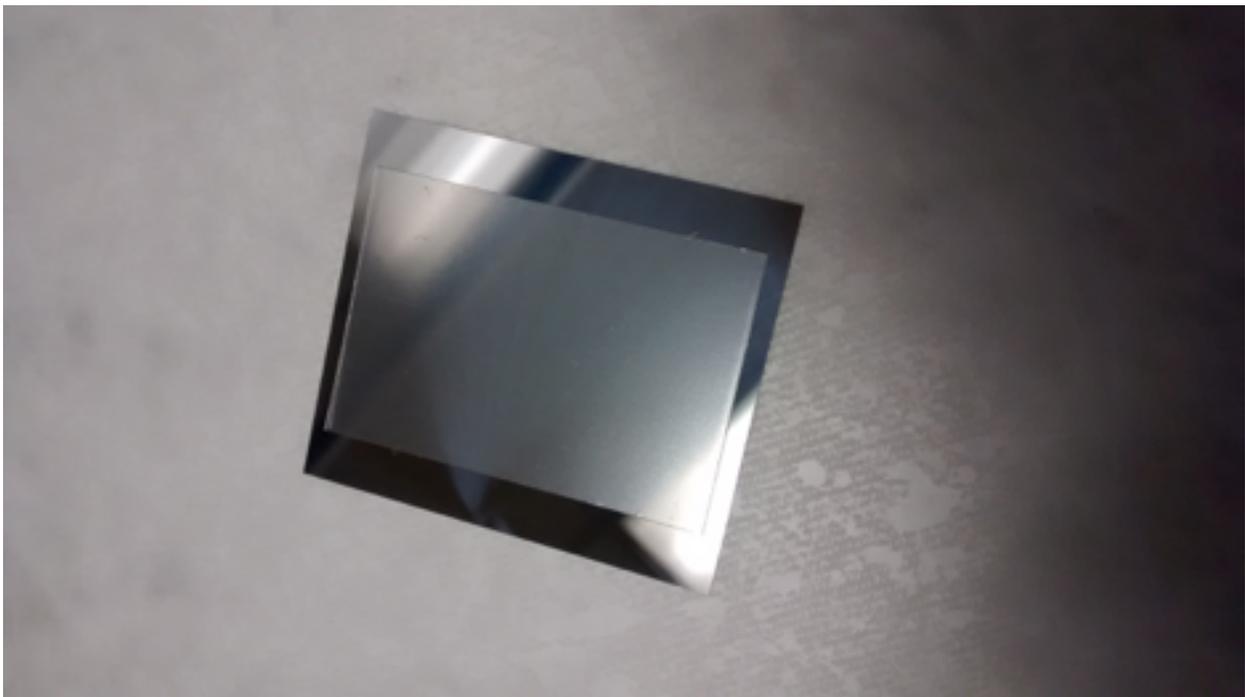
Repeat on the other side in order to arrange all four chips.



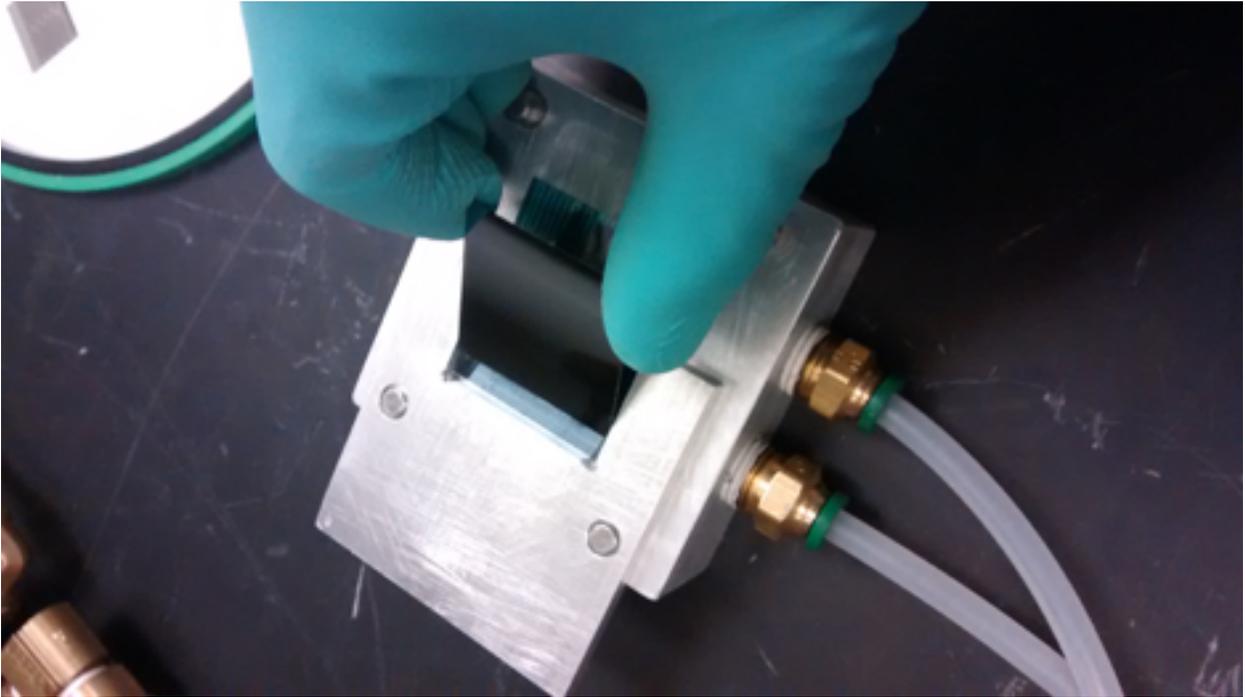
Now, place the other alignment plate on top. There should be a slight groove cut on one side of this plate, and this should face down.



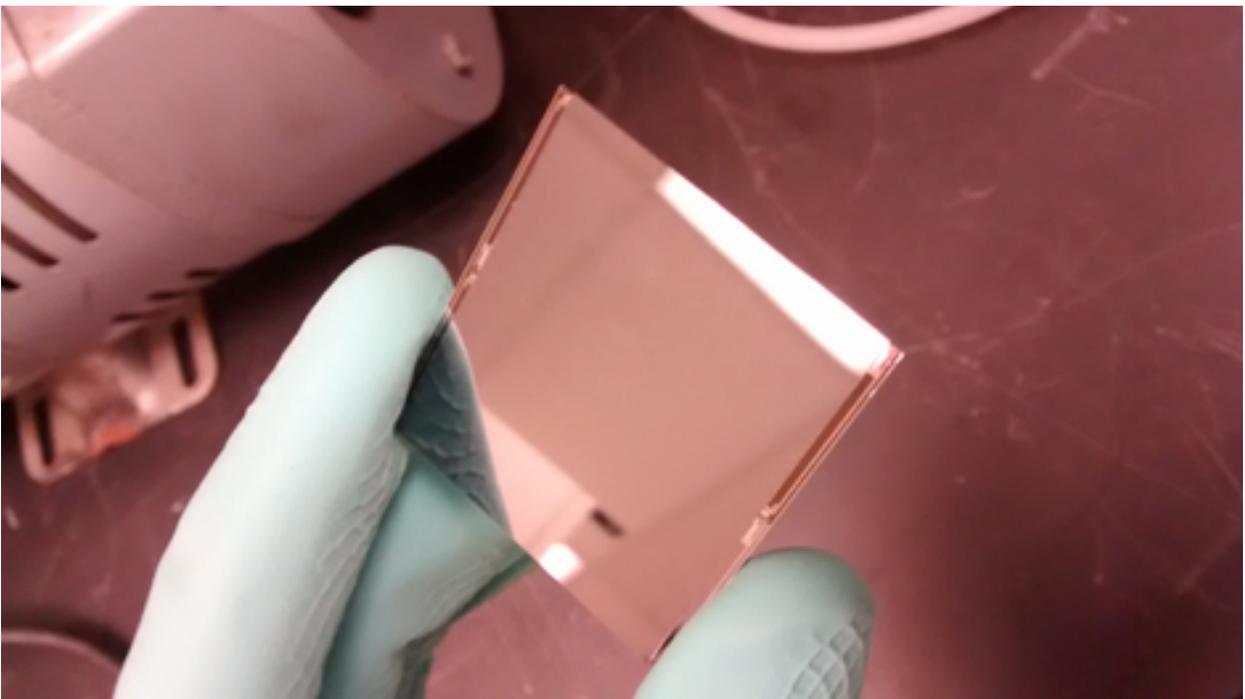
Use scissors to cut a piece of double-sided epoxy, expose one side, and attach it to the silicon sensor. The tape does not need to reach all the way to the sides.



Now, remove the other side of the epoxy tape, and use the alignment jig to attach it to the front-end chips. In the case of a 1X2 module, you will only attach two of the front end chips.



You have an assembled detector module without the flex cable.

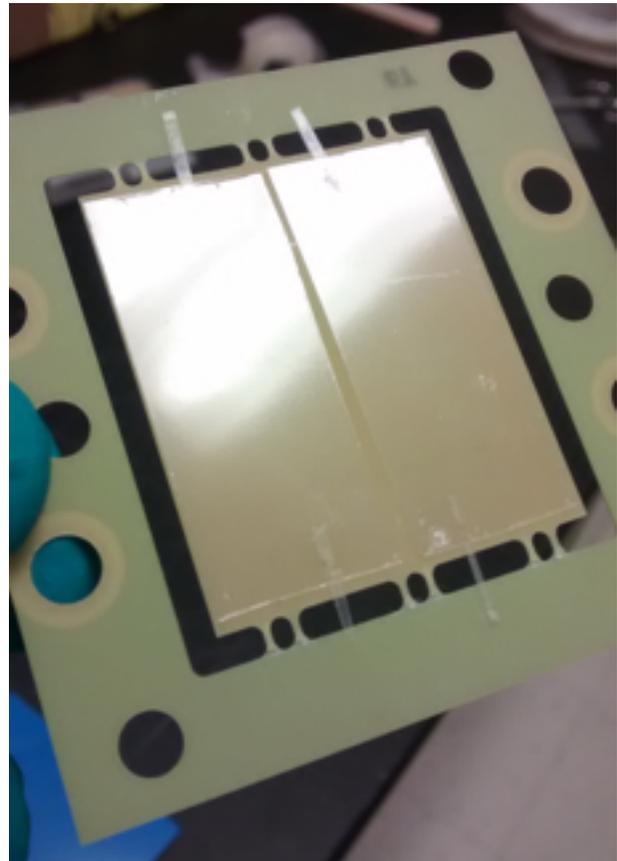
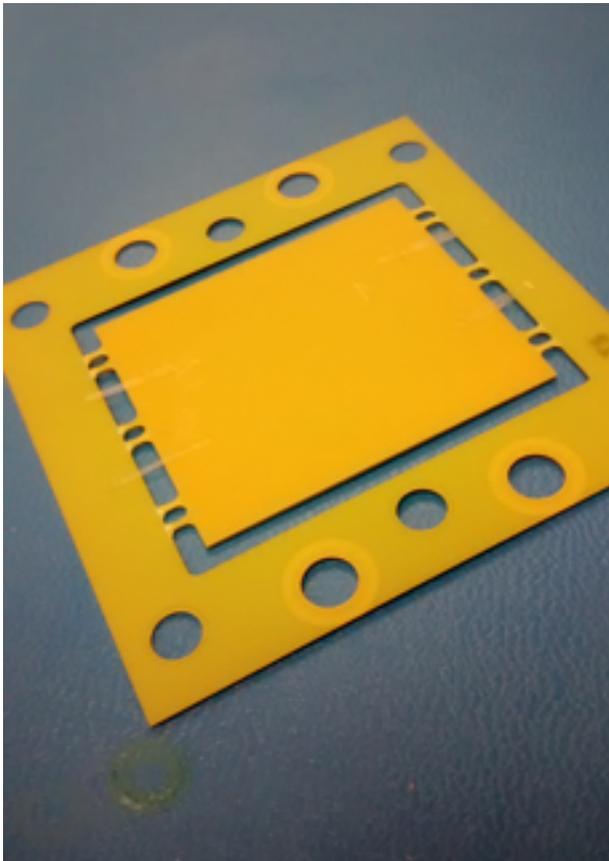


Here's what it looks like for a 1x2 detector.

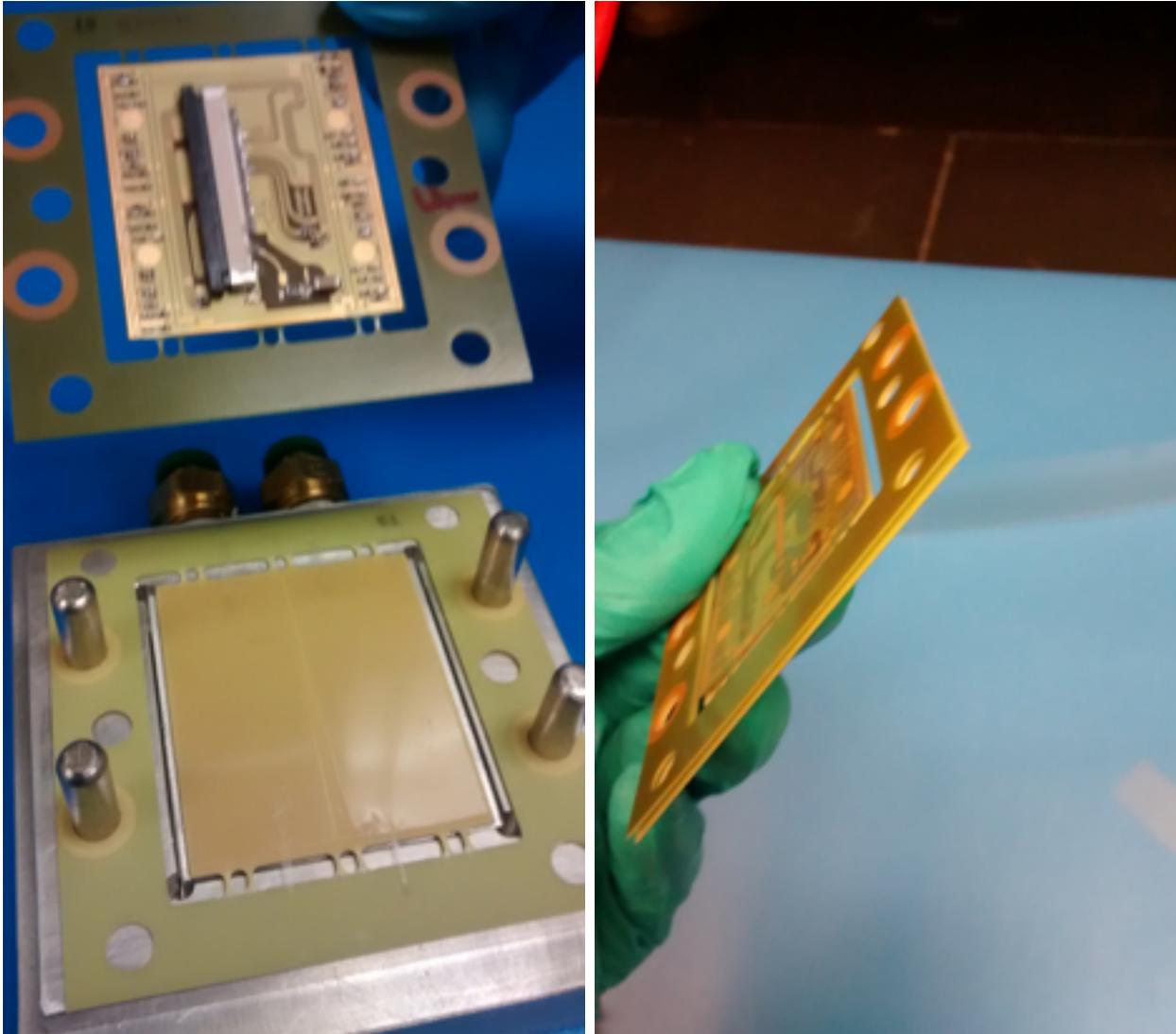


Now, attach the flex cable to the front end chips using epoxy again and a second alignment jig. For the 1x2 modules, you'll need to cut the flex cables in half first.

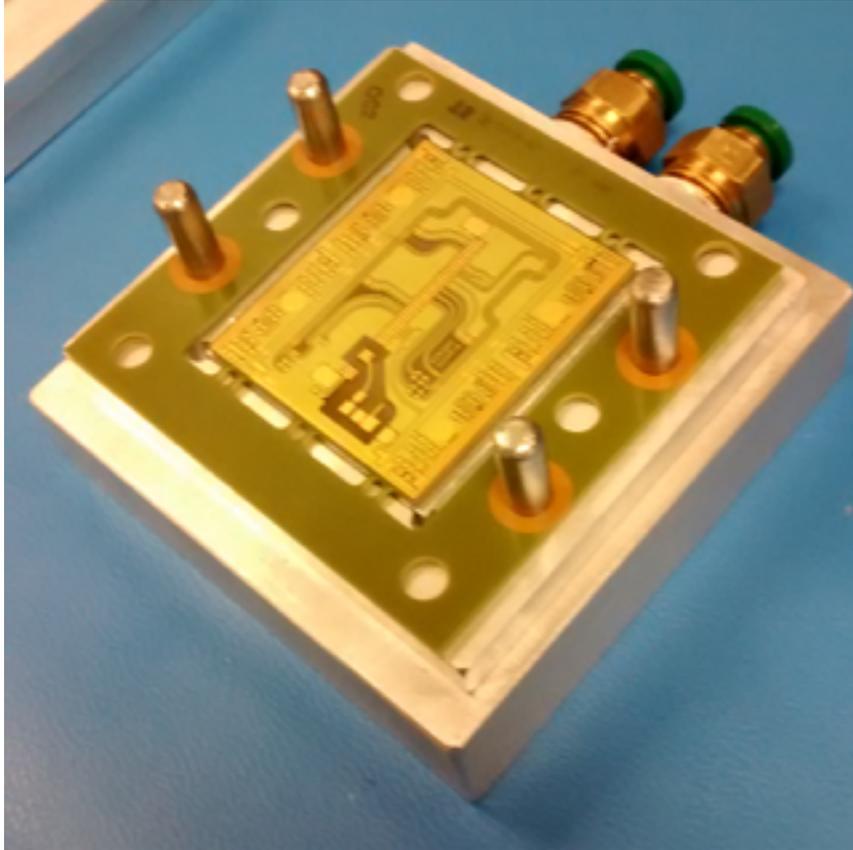
In order to attach the epoxy tape to the flex cable accurately, use a secondary flex cable. Begin by cutting the epoxy and, using double-sided Scotch tape, attach the epoxy on the secondary cable, unexposed. Make sure the tape goes almost all the way to the edges with the bump pads. Do not let the tape go over the edge, or there will be exposed epoxy on the final module.



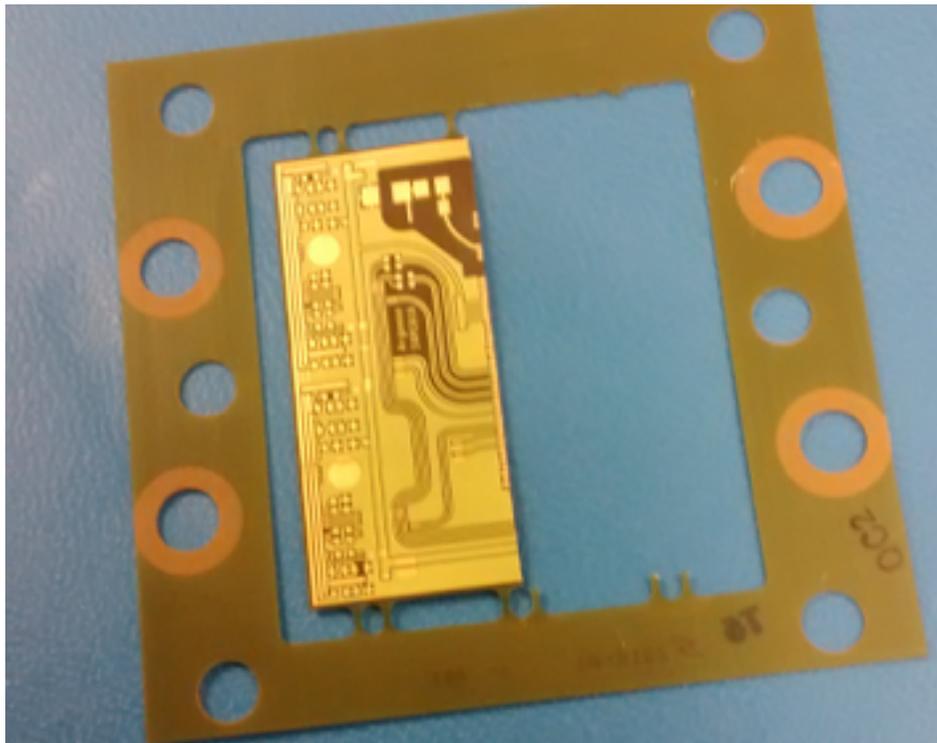
Now expose one side of the epoxy tape after placing the secondary flex cable in the jig. Place the flex cable for use onto the exposed epoxy to transfer the tape correctly. Remove the epoxy tape from the secondary flex cable and double-sided Scotch tape.



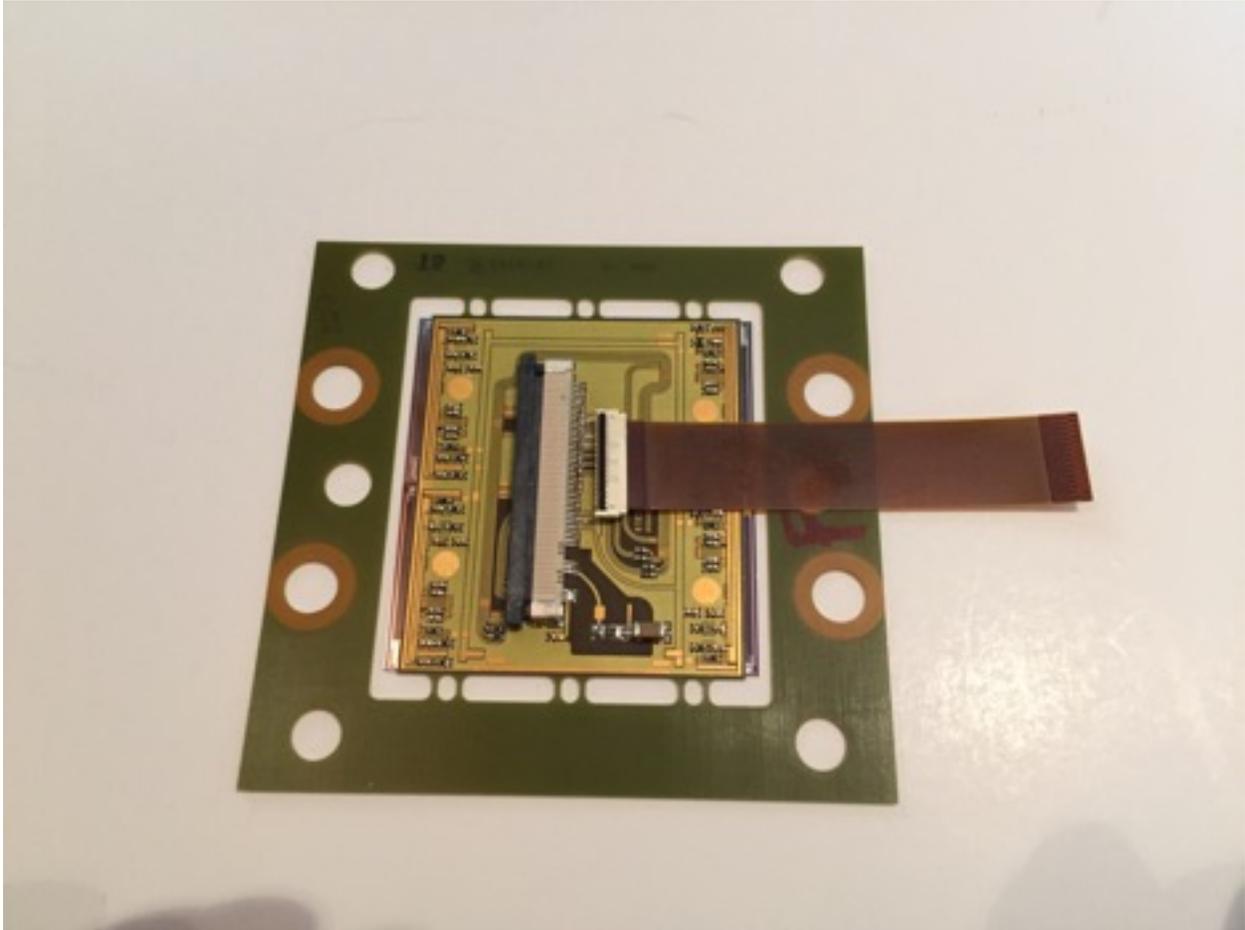
Using the flex cable jig, attach the detector module to the flex cable by exposing the other side of the epoxy and lowering the flex cable onto the module.



For the 1x2 modules, you'll do this whole process with cables cut in half.



The complete detector looks like the following picture. In this image, additional components have been added on to the flex cable, but this did not change the assembly procedure.



Now the module is ready for wire-bonding.